What is claimed is:

1. A method of pausing an MPEG coded video stream including a series of groups of pictures, each group of pictures (GOP) including an I frame and a plurality of B or P frames, said method comprising

selecting an I frame from the MPEG coded video stream;

constructing a pause GOP from the selected I frame, the pause GOP including an I frame, freeze frames, and padding;

making a seamless transition from the MPEG coded video stream to the pause GOP; and

playing the pause GOP a plurality of times in succession.

2. The method as claimed in claim 1, which includes selecting a number of frames to include in the pause GOP to obtain a desired constant frame rate when the pause GOP is played a plurality of times in succession.

3. The method as claimed in claim 2, wherein the constructing of the pause GOP includes adding stuffing to the pause GOP, and the method includes inserting padding in a transport stream for the playing of the pause GOP a plurality of times in succession, so that the transport stream for the playing of the pause GOP a plurality of times in succession has a substantially constant bit rate, and a video buffer verifier for the transport stream has a level at the end of the pause GOP that is substantially the same as a

level at the beginning of the pause GOP each of the plurality of times that the pause GOP is played in succession.

4. The method as claimed in claim 1, wherein the pause GOP is played a plurality of times in succession until a resume is requested, and when a resume is requested, a seamless transition is made to playing of the MPEG coded video stream beginning with the I frame selected from the MPEG coded video stream.

5. The method as claimed in claim 1, wherein the I frame selected from the MPEG coded video stream is in an open GOP including a B frame that follows the I frame in transmission order but precedes the I frame in display order, and the making of a seamless transition to playing of the MPEG coded video stream beginning with the I frame includes replacing the B frame that follows the I frame in transmission order with a B freeze frame that displays the picture of the I frame.

6. The method as claimed in claim 1, wherein the freeze frames are dual-motion encoded P frames that repeat a single field in the I frame selected from the MPEG coded video stream.

7. The method as claimed in claim 1, wherein the selected I frame in the MPEG coded video stream has a top field and a bottom field, the top field of the selected I frame in the MPEG coded video stream is substantially different from the bottom field of the selected I frame in the MPEG coded video stream, and wherein the method includes

constructing the pause GOP to include an I frame having a top field and a bottom field that are substantially the same.

8. The method as claimed in claim 1, wherein the method includes constructing the pause GOP so that the I frame in the pause GOP has a top field and a bottom field that are substantially the same.

9. The method as claimed in claim 8, wherein the selected I frame in the MPEG coded video stream is field-picture encoded, and the method includes constructing the pause GOP so that said one of the top and bottom fields of the I frame in the pause GOP is substantially identical to said one of the top and bottom fields of the selected I frame in the MPEG coded video stream, and the other of the top and bottom fields of the transcoded I frame in the pause GOP is encoded as a fully predicted P field picture.

10. The method of claim 8, wherein the selected I frame in the MPEG coded video stream is frame-picture encoded, and the method includes producing the I frame in the pause GOP from the selected I frame in the MPEG coded video stream by replacement of coded field luminance blocks for the other of the top and bottom fields of the I frame in the pause GOP.

11. The method of claim 8, wherein the selected I frame in the MPEG coded video stream is frame-picture encoded, and the method includes producing the I frame in the

pause GOP from the selected I frame in the MPEG coded video stream by performing field line replacement for frame DCT coded macroblocks.

12. The method as claimed in claim 11, wherein the field line replacement is performed in the DCT domain by a linear transformation upon DCT coefficients of each frame DCT coded macroblock of the selected I frame in the MPEG coded video stream to produce DCT coefficients of a corresponding macroblock of the I frame in the pause GOP.

13. The method of claim 8, wherein the selected I frame in the MPEG coded video stream is frame-picture encoded, and the method includes producing the I frame in the pause GOP from the selected I frame in the MPEG coded video stream by progressive replacement of a field on a slice-by-slice basis.

14. The method of claim 8, wherein the selected I frame in the MPEG coded video stream is frame-picture encoded, and the method includes producing the I frame in the pause GOP from the selected I frame in the MPEG coded video stream by a two-step replacement of a field on a slice-by-slice basis.

15. The method as claimed in claim 1, which includes producing the I frame of the pause GOP during playing of the pause GOP, the pause including a playing of an initial I frame including at least portions of top and bottom fields that are substantially the same

as corresponding portions of the top and bottom fields of the selected I frame in the MPEG coded video stream.

16. The method as claimed in claim 15, which includes playing a contiguous sequence of dual-motion encoded P freeze frames from said initial I frame to the I frame of the pause GOP, the dual-motion encoded P freeze frames repeating one of a top field and a bottom field of said initial I frame.

17. The method as claimed in claim 1, which includes playing audio presentation units of an audio stream associated with the MPEG video stream, wherein the selected I frame in the MPEG coded video stream has a video presentation unit, the playing of the audio presentation units is suspended during the playing of the pause GOP, an entire audio presentation unit is played which is a last audio presentation unit to be played before the playing of the audio presentation units is suspended, and the last audio presentation unit to be played before playing of the audio presentation units is suspended is the last audio presentation unit of said audio stream that begins during the video presentation unit of the selected I frame in the MPEG coded video stream.

18. The method of claim 17, which includes resuming play of the MPEG video stream on the selected I frame of the MPEG coded video stream after playing of the pause GOP, and resuming the playing of the audio presentation units after playing of the audio presentation units is suspended, wherein the first audio presentation unit to be played during the resuming of the playing of the audio presentation units is the first audio

presentation unit to end during the video presentation unit of the selected I frame of the MPEG coded video stream.

19. The method as claimed in claim 1, which includes responding to a command to seek to a specified I frame in the MPEG coded video stream by producing a seamless transition from the playing of the pause GOP to playing of a new pause GOP produced from the specified I frame in the MPEG coded video stream and including some freeze frames.

20. A method of pausing an MPEG-2 coded video stream including a series of groups of pictures, each group of pictures (GOP) including an I frame and a plurality of B or P frames, said method comprising

selecting an I frame from the MPEG-2 coded video stream;

constructing a pause GOP from the selected I frame, the pause GOP including an I frame and a number of dual-motion frozen P frames and padding to obtain a desired frame rate when the pause GOP is played a plurality of times in succession, the dual-motion frozen P frames presenting a top field and a bottom field that is substantially the same as the top field;

making a seamless transition from the MPEG-2 coded video stream to the pause GOP; and

playing the pause GOP a plurality of times in succession, while inserting into the MPEG-2 stream a selected amount of padding to obtain a desired constant bit rate, and restamping PTS, DTS, and continuity counter values in the MPEG-2 stream.

21. The method as claimed in claim 20, wherein the pause GOP is played a plurality of times in succession until a resume is requested, and when a resume is requested, making a seamless transition to playing of the MPEG-2 coded video stream beginning with the I frame selected from the MPEG-2 coded video stream, wherein the I frame selected from the MPEG-2 coded video stream is in an open GOP including a B frame that follows the I frame in transmission order but precedes the I frame in display order, and the making of a seamless transition to playing of the MPEG-2 coded video stream beginning with the I frame includes replacing the B frame that follows the I frame in transmission order with a B freeze frame that displays the picture of the I frame.

22. The method as claimed in claim 20, wherein the method includes constructing the pause GOP so that the I frame in the pause GOP has a top field and a bottom field, and each of the fields in the I frame in the pause GOP has substantially the same pixel values as one of the top and bottom fields of the selected I frame in the MPEG-2 coded video stream.

23. The method as claimed in claim 22, wherein the selected I frame in the MPEG-2 coded video stream is field-picture encoded, and the method includes constructing the pause GOP so that said one of the top and bottom fields of the I frame in the pause GOP is substantially identical to said one of the top and bottom fields of the selected I frame in the MPEG-2 coded video stream, and the other of the top and bottom fields of the transcoded I frame in the pause GOP is a fully predicted P field picture.

24. The method of claim 22, wherein the selected I frame in the MPEG-2 coded video stream is frame-picture encoded, and the method includes producing the I frame in the pause GOP from the selected I frame in the MPEG-2 coded video stream by replacement of coded field luminance blocks for the other of the top and bottom fields of the I frame in the pause GOP.

25. The method of claim 22, wherein the selected I frame in the MPEG-2 coded video stream is frame-picture encoded, and the method includes producing the I frame in the pause GOP from the selected I frame in the MPEG-2 coded video stream by performing field line replacement for frame DCT coded macroblocks.

26. The method as claimed in claim 25, wherein the field line replacement is performed in the DCT domain by a linear transformation upon DCT coefficients of each frame DCT coded macroblock of the selected I frame in the MPEG-2 coded video stream to produce DCT coefficients of a corresponding macroblock of the I frame in the pause GOP.

27. The method as claimed in claim 20, which includes producing the I frame of the pause GOP during playing of the pause GOP, the pause including a playing of an initial I frame including at least portions of top and bottom fields that are substantially the same as corresponding portions of the top and bottom fields of the selected I frame in the MPEG-2 coded video stream.

28. The method as claimed in claim 27, which includes playing a contiguous sequence of dual-motion encoded P freeze frames from said initial I frame to the I frame of the pause GOP.

29. The method as claimed in claim 20, which includes:

playing audio presentation units of an audio stream associated with the MPEG-2 video stream, wherein the selected I frame in the MPEG-2 coded video stream has a video presentation unit, the playing of the audio presentation units is suspended during the playing of the pause GOP, an entire audio presentation unit is played which is a last audio presentation unit to be played before the playing of the audio presentation units is suspended, and the last audio presentation unit to be played before playing of the audio presentation units is suspended is the last audio presentation unit of said audio stream that begins during the video presentation unit of the selected I frame in the MPEG-2 coded video stream; and

resuming play of the MPEG-2 video stream on the selected I frame of the MPEG-2 coded video stream after playing of the pause GOP, and resuming the playing of the audio presentation units after playing of the audio presentation units is suspended, wherein the first audio presentation unit to be played during the resuming of the playing of the audio presentation units is the first audio presentation unit to end during the video presentation unit of the selected I frame of the MPEG-2 coded video stream.

30. The method as claimed in claim 20, which includes responding to a command to seek to a specified I frame in the MPEG-2 coded video stream by producing a seamless transition from the playing of the pause GOP to playing of a new pause GOP produced from the specified I frame in the MPEG-2 coded video stream and including some P or B freeze frames.